Advanced optical design for multicolored LED systems for lighting applications

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Advanced optical design for multicolored LED systems for lighting applications

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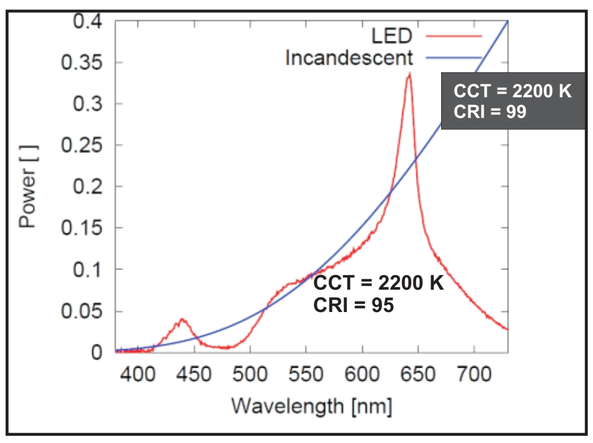
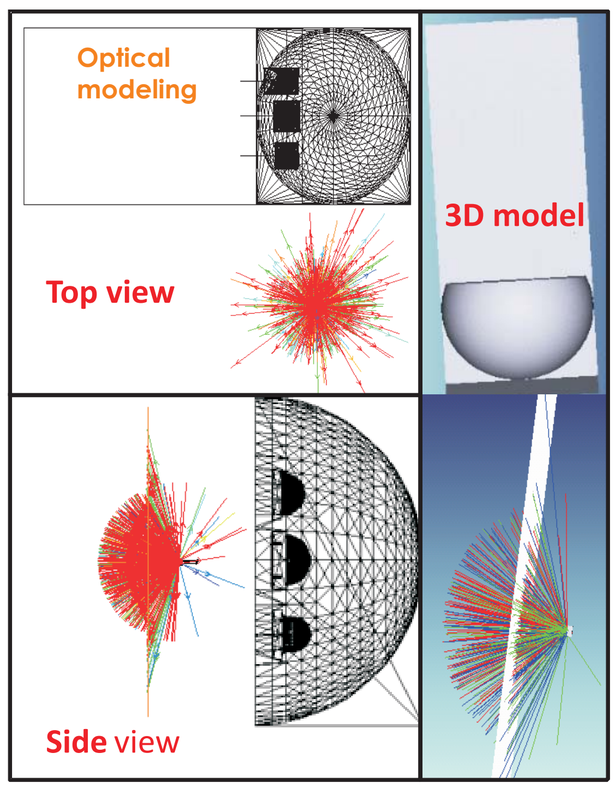
LED illumination of the Danish Royal Treasures at Rosenborg Castle

We have optimized and optically modeled the Rosenborg LED system to discover angular distribution in terms of intensity and measured the tristimulus value for color mixing. We have also experimentally proved the system by color correlated temperature (CCT) tuning from 2000 K to 2400 K. Rosenborg system is a high light quality, energy efficient (> 30 lm / W) LED system and has been implemented at Rosenborg Castle with three colored LEDs. By color mixing of the LEDS, 2200 K CCT was achieved with color rendering index (CRI) above 90 and rendering the blue background perfectly.



The LED lighting

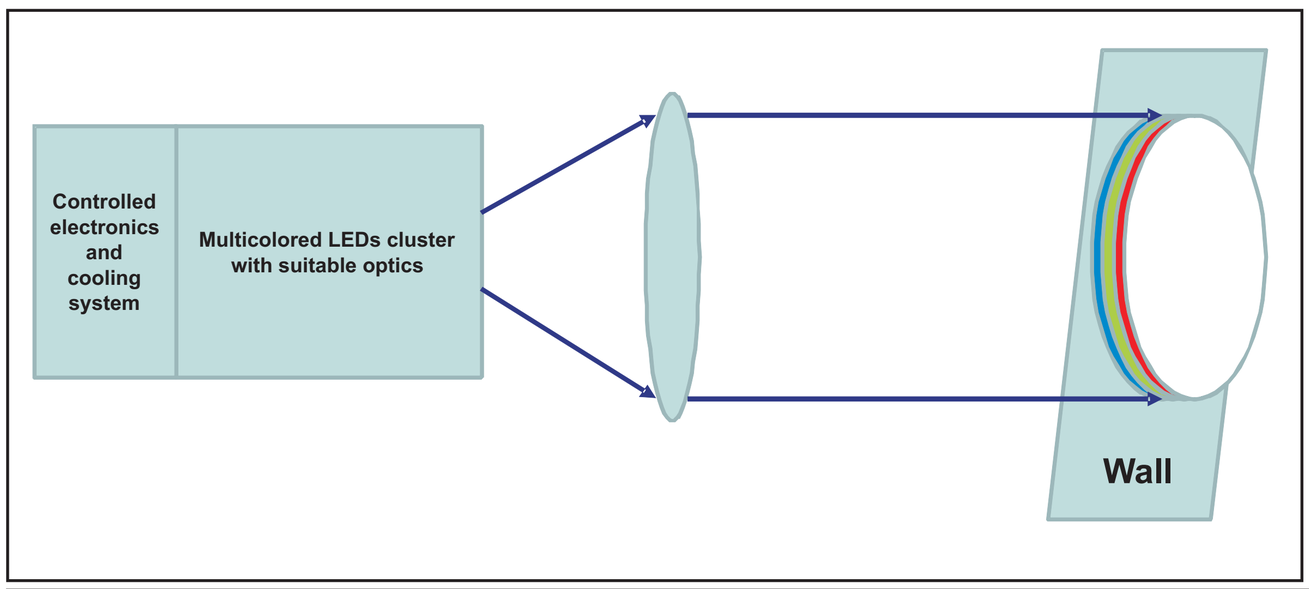
- High light quality
- Energy efficiency < 30 lm / W
- Uses 28 W in display case
- Little heating < 1 degree
- Long life span > 30,000 h
- Renders the blue background



Collaboration between DTU Fotonik, Lumodan Aps. and The Royal Danish Collections. Financially supported through PSO-funds under project no. 339-025 by ELFORSK under the Danish Energy Association. Ref.:Thorseth, A,Corell, Dennis D, Poulsen, Peter B, Hansen, Søren S,and Dam-Hansen, C; Proc. of SPIE Vol. 8278 82781N-4

Multi color high power LED engine

We are developing a new LED-based light engine that will take the LED technology into the future of professional lighting. By meeting the entertainment industry's critical demands for color gamut, color rendering of white light and intensity, the light engine will finally enable a revolutionary replacement of the energy consuming halogen based light sources in professional lighting.



Novel features of the system

- New optical system that collimates and combines the light
- Can be controlled in a large color gamut
- White light in a wide range of color temperature (2700 K – 6500 K) with high color rendering
- Color rendering index higher than 95
- High output ~ 10000-20000 lm
- Uniform and homogeneous output throughout the spot size
- Application: stage lighting and it could replace the conventional lamps of ~ 1000W

Collaboration between DTU Fotonik;
Brother, Brother & Sons Aps;
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Højteknologifonden

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